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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/249,292	02/12/99	ONO	T 503.36911X00

020457 IM52/0731  
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EXAMINER  
OLSEN, A

ART UNIT	PAPER NUMBER
1746	12

DATE MAILED: 07/31/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.

09/249,292

Applicant(s)

ONO ET AL.

Examiner

Allan W. Olsen

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2001.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 24-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 24-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.

- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1-7 and 24, 25 and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Kaji (U.S. 6,129,806).

The rejection of claims 1-7 of the previous Office action is maintained. Newly added claims 24, 25 and 27 are likewise rejected as Kaji teaches a method of etching submicron features such that the selectivity and the anisotropy of an etching process are improved. Kaji does not provide an example that explicitly describes obtaining a feature size of .5 microns or less. However, Kaji teaches that a shortcoming of prior art etching processes lies is their inability to adequately provide a fine pattern with features of .2 microns or smaller on a wafer having a diameter larger than 300 mm. Kaji states that the method performs the required fine pattern processing and the method easily performs the precise manufacturing of a fine pattern on a wafer having a diameter larger than 300 mm. In this context, it is clear to one skilled in the art that Kaji's disclosure is in fact directed to a method of etching fine patterns which are on the order of about 0.2 microns. See: col. 1, lines 5-9; col. 2, lines 42-45; col. 3, lines 24-30; col. 4, line 66–col. 5, line 3; col. 5, lines 11-15; col. 8, line 65-67; col. 9, lines 41-42; col. 10, lines 14-15; col. 17, lines 25-28; col. 23, lines 64-67; col. 27, lines 15-17; col. 28, line 65–col. 29, line 3; col. 29, line 64–col. 30, line 2; col. 33, line 48–col. 34, line 10.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaji in view of U. S. Patent 4,893,166 issued to Geekie.

Kaji teaches the limitations of the base claim 1 as noted above. Claim 26 further adds the limitation of etching to obtaining vertical sidewalls. This is taught by Kaji at column 27, lines 15-18. Additionally it is taught that the method of Kaji allows one to perform highly precise shape control (column 23, lines 66-67) as the reaction on the surface of the wafer can be easily controlled (column 32, lines 1-5).

Kaji does not teach etching to achieve a flatly etched bottom surface. Geekie teaches etching so as to achieve a structures having a flat bottom.

It would have been obvious to one skilled in the art to etch a flat bottom surface with the method of Kaji because Geekie teaches that better contacts are formed when such structures are subsequently filled.

***Response to Arguments***

Applicant's arguments filed July, 5, 2001 have been fully considered but they are not persuasive. Applicant argues that Kaji does not teach using a pulsed bias having a  $V_{pp}$  that is greater than what the  $V_{pp}$  would be in a constantly biased etching process that would provide the same etching rate.

The examiner's position was, and still is, that this limitation is an inherent feature of Kaji. The examiner contends that changing the bias of an etching process from a continuous bias to a pulsed bias, without changing the  $V_{pp}$ , will inherently result in a reduction of the etching rate. Therefore, upon switching from a continuous bias to a pulsed biased there must be a concomitant increase in the  $V_{pp}$  in order for the pulsed bias operation to achieve the same etch rate as the continuously biased operation. It follows that for a pulsed bias process to achieve the same etch rate as a continuously biased process the  $V_{pp}$  of the pulsed bias must be greater than the  $V_{pp}$  of the continuously biased process.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is (703) 306-9075. The examiner can normally be reached on Monday through Friday from 9:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached on (703) 308-4333. The fax phone number for this Group is (703) 305-7719.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Allan Olsen, Ph.D.  
July 27, 2001



RANDY GULAKOWSKI  
SUPERVISORY PATENT EXAMINER  
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